a compound fracture with a strip of linen soaked in coarse, impure, undiluted carbolic acid. What came of that experiment the world knows, and is not yet tired of knowing. But he could not then foresee the wealth of new discoveries which followed, incessantly, this first method of dealing with "germs of putrefaction." Least of all could he foresee the swift rise of bacteriology, its extension over the whole art and science of medicine and surgery, and its magnificent achievement of protective treatments, antitoxins, and vaccines. But he lived to see them, and to help to make them possible. We are likely to have in our hands, before many months, the final and authoritative record of his life and of his work. It will be a book worth waiting for, and it will be, even in these hard times, a book worth buying.

Meanwhile, for all who love to read of surgery —and who does not?—there are two admirable lectures by Keen of Philadelphia, entitled "Before and After Lister." They were given to the United States Army Medical School a few weeks ago, and are published in *Science,* June 11 and 18. They have much to say of military surgery, past and present, and they say it very well. There is also a very striking article in the *Times* of June 28, on "Wounds and Blood-poisoning," and on the present work of Sir Almroth Wright at Boulogne. The lectures and the article, between them, give us a good insight into the *progrès en spirale* of surgery, from 1865 to 1915.

NOTES.

IT was announced on July 5 that Admiral of the Fleet Lord Fisher of Kilverstone had been appointed chairman of the Inventions Board established to assist the Admiralty in co-ordinating and encouraging scientific effort in relation to the requirements of the Naval Service. The arrangements for the organisation of the Board have now been completed. It will comprise:—(*a*) A Central Committee; (*b*) a Panel of Consultants composed of scientific experts who will advise the main Committee on questions referred to them. The Central Committee will consist of:—Lord Fisher of Kilverstone, G.C.B., O.M. (president), Sir J. J. Thomson, O.M., F.R.S., Hon. Sir C. A. Parsons, K.C.B., F.R.S., Dr. G. T. Beilby, F.R.S. The Consulting Panel will comprise the following list, which will be added to from time to time as necessary:—Prof. H. B. Baker, F.R.S., Prof. W. H. Bragg, F.R.S., Prof. H. C. H. Carpenter, Sir William Crookes, O.M., F.R.S., Mr. W. Duddell, F.R.S., Prof. Percy Frankland, F.R.S., Prof. Bertram Hopkinson, F.R.S., Sir Oliver Lodge, F.R.S., Prof. W. J. Pope, F.R.S., Sir Ernest Rutherford, F.R.S., Mr. G. Gerald Stoney, F.R.S., Hon. R. J. Strutt, F.R.S. The Board is accommodated temporarily in the Whitehall Rooms, Hotel Métropole, Whitehall Place, S.W., but at an early date (which will be announced in due course) it will be transferred to permanent offices at Victory House, Cockspur Street, S.W. Communications should be addressed to the secretary, Board of Invention and Research.

WE regret to announce the death in action on the western front, on Saturday, July 10, of Lieut. Ernest Lee, a young botanist of considerable promise, who had already published some excellent work, notably a paper in 1911 on leaf-fall. Lieut. Lee obtained a national scholarship in 1906, and while at the Royal College of Science, South Kensington, was both Marshall scholar and Forbes medallist. He was an associate of the Royal College of Science and a fellow of the Linnean Society. In 1910 he became assistant lecturer in the botanical department at the Birkbeck College, London, and in 1913 went to the University of Leeds as a lecturer in agricultural botany. He there became a member of the Leeds O.T.C., and obtained a commission in the Duke of Wellington's Regiment soon after war broke out. In the autumn of 1914 he married Miss H. S. Chambers, lecturer in botany at the Royal Holloway College. Lieut. Lee was killed instantaneously by a bullet while with his guns, and he will be greatly regretted by all who knew him or his work.

LAST week we recorded with regret the death, at the age of twenty-seven, of Mr. H. S. Bion, assistant superintendent of the Geological Survey of India. Mr. Bion was born in India, and was educated at the School for the Sons of Missionaries at Yvesdon House, Blackheath, and at University College, London. His university career was a distinguished one. In 1905 he obtained the university scholarship in geology, and in 1906 the Morris geological prize. In 1908 he took the degree of B.Sc. in the University of London, obtaining first-class honours in geology. In 1911 he was elected a fellow of the Geological Society. In February, 1911, he joined the Geological Survey of India, and in the following November he was appointed curator of the museum and lecturer in the Presidency College, Calcutta. His work in the field was chiefly in Burma and Kashmir, and he did particularly valuable work in the latter area, especially among the Carboniferous rocks. His marked ability, his unselfish character, and scientific enthusiasm, endeared him to all with whom he came in contact, and his untimely death is deeply regretted by his former teachers in this country, his colleagues of the Indian Survey, and his numerous friends.

BY the death of Mr. R. W. Raper, fellow, vice-president, and bursar of Trinity College, the University of Oxford has suffered a serious loss. For some time his health had been failing, but the news of his sudden decease has come as a shock to his friends in Oxford, who had seen him walking about as usual up to within a very recent period. Mr. Raper was one of the best known and most highly respected of Oxford residents. His services to his college were of great value. The combination of clear-headed business aptitude, firmness in action, and humorous but not unsympathetic methods of dealing with difficult situations made him an almost ideal college bursar. Countless undergraduates have good cause to remember his generous friendship and refined hospitality. As a promoter of public interests he did a great work, both in his University and in his paternal home at Malvern. Oxford holds in especial gratitude his action in defending the top of Shotover Hill from enclosure. The preservation of beauty, whether in nature or in art, always found in him an enthusiastic champion.

HERBERT KYNASTON, whose death was recorded in our issue for July 15, was the son of the late Dr. Kynaston, Canon of Durham, and was born on July 19, 1868. He entered King's College, Cambridge, making a special study of geology, and securing a first class in part ii. of the Natural Sciences Tripos in 1891. He proceeded to examine the volcanic rocks of Old Red Sandstone age in the Cheviot Hills, and was appointed an assistant geologist to the Geological Survey (Scottish Branch) on May 3, 1895. His first official work lay among the Old Red Sandstone rocks of Lorne and Glencoe, and he made important contributions to the Memoirs on Mid-Argyll and the Oban and Dalmally districts. He resigned his post in January, 1903, to take up the difficult duties of director of the reconstituted Geological Survey of the Transvaal, and numerous members of the British Association will recall his kindly guidance during a memorable visit to South Africa in 1905. The first report under his auspices, that for 1903 (see NATURE, vol. lxxi., p. 53), contains a paper by him and his colleague, A. L. Hall, on diamond-bearing pipes and alluvial deposits. He described in later reports the Komati Poort coalfield and the tin-deposits of Waterberg, south of the Limpopo, and much of his work had to be carried on in advance of the mapping of the country. When, under the Union Government, the Geological Surveys of the provinces were united, Kynaston was selected as director, and he initiated the series of Memoirs of the Geological Survey of South Africa. His death at Pretoria on June 28, 1915, at the early age of forty-six, will be regretted as much in Scotland as in South Africa, and some of his observations on the Glencoe area are embodied in a memoir that is still passing through the press. One of his colleagues writes of him with simple feeling as a man who was "a true friend, of quiet disposition, but full of kindly humour and affection."

WE learn from *Science* that Dr. Viktor von Lang, emeritus professor of physics at Vienna, has been elected president of the Vienna Academy of Sciences. The academy has elected as corresponding members Dr. Sven Hedin, Dr. Max Planck, professor of mathematical physics at Berlin, and Dr. P. H. von Groth, professor of mineralogy at Munich.

THE Livingstone gold medal of the Royal Scottish Geographical Society has been awarded to Lord Kitchener in recognition of his work on the survey of Palestine, and as a director of the survey of Cyprus, as well as in recognition of his signal services to the State. The society's gold medal has been awarded to Dr. J. Scott Keltie, late secretary of the Royal Geographical Society, in consideration of his services to geographical science.

WE regret to record the death on June 18 of Mr. T. D. West, at Glenville Hospital, Cleveland, Ohio. *Engineering* for July 16 contains a brief account of his career. Mr. West was born in Manchester in 1851; his parents emigrated to the United States when he was an infant. He entered a foundry at the age of twelve, and was connected with foundry work throughout his life; he was a recognised authority on subjects pertaining to foundry work. At the time of his death he was chairman of the West Steel Casting Co., Cleveland. He was a member of several American societies, and was the author of several books and pamphlets on foundry practice.

THE annual meeting of the general committee of the Imperial Cancer Research Fund was held on Tuesday, July 20, Sir William Church in the chair. The work of the fund has been greatly curtailed owing to the war, and the scientific part of the annual report is restricted to a summary of the work published during the year. The work comprises an experimental study of metastasis, which emphasises the importance of the processes at the site of arrest of tumour emboli, an investigation into immunity to transplanted sarcomata extending the well-known findings with regard to carcinoma to the connective tissue tumours, and biochemical studies. The two biochemical papers deal with the action of ferments. The first is concerned with the effect of minute alterations in the reaction of the medium on the activity of a maltose hydrolysing ferment. The second deals with the action of the protein-splitting ferment present in normal serum of man and animals as accounting for the phenomena comprised in the Abderhalden serum reaction. The conclusion is drawn that the doctrine of specific protective ferments set up by Abderhalden is unsound, and that the reaction even in its improved form cannot be relied on for the serum-diagnosis of pregnancy or cancer. The report also discusses the pathological bearings of the new and interesting data in the Registrar-General's Report for 1913 on the influence of marital condition in women on the mortality from cancer of organs special to their sex.

THE *Engineering Magazine* for July contains an interesting article on war orders and their effects on American industry. Sales of benzol have been much stimulated by the war, and the price has been quintupled. American makers of explosives have had two problems to solve, first, to expand their plants; secondly, to change over their processes to make foreign powder. These, together with the problem of securing a sufficient supply of raw materials, such as benzol, have been pretty well solved, and the production of explosives is proceeding on a tremendous scale. Many makers who have undertaken orders for shells have made heavy purchases of machine tools for executing the orders; these firms have been unwilling to fill their existing plants with such special work at the expense of inconveniencing their regular customers. Evidently these firms are looking for a strong revival in domestic demands. The Westinghouse Electric and Manufacturing Company, after accepting a large order for rifles, bought two plants—the Stevens Arms Company and the Stevens-Duryea Automobile Company—in order to take care of the work outside of its Pittsburgh plants. Mr. J. F. Wallace, formerly chief engineer of the Panama Canal, thinks that, as a consequence of the huge orders placed, the United States will have the means of providing for national defence; the plants now used for supplying European requirements could be used to equip home armies in a remarkably short time. In other words, the United States has obtained insurance against attack for practically nothing, so far as equipment preparation will provide.

IN the July issue of *Man* Mr. E. J. Wayland describes a series of stone implements collected by him on the Monapo river in the Portuguese province of Mozambique, East Africa. All, with one possible exception, are extremely crude, being chipped out of nodules of chalcedony and jasper with which the basalt ridges of the sedimentary coast belt are bestrewn. There is no certainty about their age, the fact that they are found on the surface not necessarily showing that they are of comparatively modern date. They closely resemble those found by Mr. Lamplugh near the Victoria Falls. No local evidence justifies their attribution to a period earlier than the early Palæolithic, but they may be of much later date.

IN *Man* for July Dr. W. H. Rivers describes specimens of the boomerang found on the coast of Espiritu Santo, New Hebrides. They differ from the Australian type in having the ends almost square or showing a slight curve not continuous with the general curvature of the implement. The antiquity of the use of the boomerang in the New Hebrides may be assumed from its connection with tribal rites, and one group claim descent from it. This discovery raises an important problem. The weapon is generally regarded as an ancient element in Australian culture, but Dr. Rivers suggests that it was introduced by the race which, in his studies on Melanesian social life, he calls the Kava people. The discovery is, he thinks, sufficient "to put us on our guard concerning the supposed antiquity of the Australian boomerang, for in spite of their difference of form, there can be no reasonable doubt that the Australian and Melanesian instruments are but divergent manifestations of the handiwork of one people."

IN his presidential address to the Royal Society of South Africa (May 19) Dr. L. Péringuey summarised the conclusions he has reached regarding Palæolithic man in South Africa. He still maintains that the early Palæolithic cultures—Chellean, Acheulean, and Mousterian—which occurred in sequence in Europe, existed together in South Africa. The later Palæolithic cultures, particularly the Aurignacean and Solutrean, are richly represented in South Africa, where they are associated, as in Europe, with a particularly realistic form of art. The evidence which associates the later Palæolithic cultures with the ancient Bushman is, in Dr. Péringuey's opinion, now quite complete. He endeavours "to show that the Bushman, if himself not the ancestor of those Solutrean and Aurignacean people, may have been of them, and that he has retained many parts of their handicraft is equally certain." Dr. Péringuey is prepared to believe that the later Palæolithic cultures of Europe were introduced from South Africa.

THE Hydrachnidæ, or water-mites, are favourite subjects of study for students of "pond-life." Such students are indebted to Messrs. W. Williamson and C. D. Soar for an illustrated account of the genus Lebertia, which appears in the Journal of the Quekett Microscopical Club, vol. xii., No. 76.

A RECENT number of the *Philippine Journal of Science* (vol. ix., section D, No. 4) is almost filled by an exhaustive account of the Palæmons of the Philippines by Dr. R. P. Cowles; a feature of the paper is the careful series of measurements of the segments of the chelate thoracic limbs in the various examples of each species described.

DR. A. RANDELL JACKSON, whose studies in British spiders are well known, has published (Proc. R. Phys. Soc., Edin., vol xix., No. 7) a "Second Contribution to the Spider Fauna of Scotland." This includes a Clubiona, hitherto undescribed, and several species not before found in Great Britain. As might have been expected, Ben Nevis and the Cairngorm group of summits proved exceptionally good collecting grounds. But why does the author write "Ben McDhui," as if the famous Aberdeenshire mountain were named after a Highland clan, instead of preserving the original "Ben Muich Dhui" (="Mount of the Black Hog")?

MANY marine animals of high interest have been made known through the activities of the Irish Fisheries Surveys. Some new light on the life-history of echinoderms has been shed by larvæ dredged or tow-netted off the south-west coast of Kerry, and described by Dr. J. F. Gemmill (Proc. R. Phys. Soc. Edin., vol. xix., No. 7). A single Brachiolaria larva, resembling that of *Asterias rubens*, is carefully figured; it was taken in a tow-net at 1150 fathoms' depth. An advanced bipinnaria stage, found in five different localities, and referred to *Luidia ciliaris*, is also described and drawn.

ORNITHOLOGISTS may turn with profit to some "Notes on the Moults and Sequences of Plumage in Some British Ducks," by Miss Annie C. Jackson, which appear in the July issue of *British Birds*, for there are yet some who hold that a colour change without a moult is not only possible but demonstrable, a conclusion based on an inability to weigh evidence and a want of knowledge of the structural peculiarities of feathers. But the merit of Miss Jackson's paper lies not so much in controverting these fallacious arguments as in establishing the fact that female surface-feeding ducks undergo a complete moult in the spring. This moult extends also to the underclothing of down-feathers. But by far the most important item in her work is the discovery that at this spring moult an additional form of down, longer and coarser, is developed, apparently to serve as a lining for the nest. Presumably this peculiar type of down is developed on the breast alone. Further particulars of the structural peculiarities of this down, which disappears with the autumn moult, would be acceptable.

A VERY useful summary of what is known in regard to the emission of light among insects is given by Mr. K. G. Blair in the Proceedings of the South

London Entomological and Natural History Society, 1914–15. Original observations, made by the author himself, add materially to the value of this contribution. Originally, it is assumed, developed as a protective device against enemies—the light-emitting qualities being associated with, or perhaps the cause of, nauseating properties—luminosity has become primarily a secondary sexual character. This much is attested by the response which can be obtained by experiment from the use of small electric bulbs. These experiments conclusively show that each species has its own characteristic method of exhibiting its light, and that an individual from any one species will, as a rule, only respond to, or evoke an answering flash from, a member of the opposite sex of that species. Some species, moreover, respond more readily to artificial flashes than others. Some will even answer the flash of a match. Luminosity in some cases, however, seems to play a directly utilitarian part, as in the case of the fly *Thyreophora cynophila*, which is said to be nocturnal in habit, and to feed on dead bodies by the light of its phosphorescent head. Finally, the author discusses numerous instances of pathological luminosity due to luminous bacteria, as in the cases of certain midges and crustacea.

STUDENTS of genetics, no less than systematists, will welcome the "Review of the South American Sciuridæ," by Mr. J. A. Allen, which appears in the Bulletin of the American Museum of Natural History, vol. xxxiv., 1915. In discussing the value of size as a "group character," the author remarks that closely related forms present a small average range of variation, *inter se*, and a very wide range of individual variation. Specificity is determined, not by individuals, but by groups of individuals. In attempting to discover tangible differences in the form of the skull and the character of the teeth in American squirrels, with a view to their use as the basis of generic or subgeneric divisions, some surprises were met with in respect to the variability of such features in specimens of the same species from the same locality. The form and the details of the crown pattern of the last premolar and the last molar were found to be extremely unstable features. The author also makes some extremely interesting observations on colour variations and the evolution of new types of coloration.

FROM the Department of Agriculture, Ceylon, have been received Bulletins Nos. 12, 13, and 14, dealing with Hevea tapping results at the experiment station, Peradeniya, the tapping of an old Hevea tree at Heneratgoda, and manuring of cacao at Peradeniya respectively. The old Hevea tree is apparently one of the original trees sent out from Kew in 1876, and its girth in August last was 117 in. at 3 feet from the ground. The tree has been tapped with short intervals over a period of 4 years 9 months, and the total yield of rubber has been 392 lb. 7 oz.

THE Polyporaceæ of Wisconsin form the subject of Bulletin xxxiii. of the Wisconsin Geological and Natural History Survey. This great family of fungi, which has been worked out by Mr. J. T. Neuman, is represented in Wisconsin by a great number of species, and Cyclomyces is the only genus unrecorded. The bulletin consists of 148 pages of descriptive text with twenty-five plates of figures, which should enable the fungi to be easily identified. As many of the Polyporaceæ are serious timber-destroying fungi the book should prove of value in the United States. Of the destructive forms, *Polyporus abietinus*, *P. pergamenus*, growing on maple, willow, oak, etc., *Trametes pini* and *Fomes ungulatus*, cause the greatest damage to timber trees.

WE have received a copy of a new publication entitled "Egyptian Agricultural Products," published by the Ministry of Agriculture, Egypt, dealing with *Sorghum vulgare*, Pers., the great millet and its varieties, and also with *S. halepense*, Pers. The account, No. 1A, 1915, has been compiled by Mr. G. C. Dudgeon, consulting agriculturist to the Ministry of Agriculture, Egypt. Botanical descriptions of the types and the varieties are given, followed by details of the history of the great millet in Egypt, and full cultural details. It seems probable that *S. halepense*, which is indigenous in Egypt, is the plant from which *S. vulgare* and its numerous varieties have been evolved. The uses of the grain and the leaves are also dealt with, and the question of the poisonous character of the young leaves is discussed. When grown under dry conditions the young leaves appear to be more poisonous than when grown moist, but as the toxic properties are destroyed by heat the precaution is always taken of exposing young leaves to the sun for some time before feeding them to cattle. When mature the leaves afford a safe cattle food.

THE first volume of the Agricultural Statistics of India (1912–13) is particularly valuable on account of the new features, which include charts, summary tables, and a comprehensive introductory report. The charts indicate considerable progress since 1901, and the increased acreage devoted to cultivation has been accompanied by an improved yield in the crops. The decline in the acreage devoted to indigo and opium continues; and the minor fluctuations in area under the other crops are shown to be largely due to rainfall deficiencies. In a comparative statement it is shown that India has under rice more than eleven times the area of the paddy fields of Japan, that India is the third country in the world in regard to acreage under wheat, since there is under that cereal three times the Canadian area and three-fifths that of the United States, that India has the largest acreage under maize outside the United States, and that the area under cotton in India is three-fifths that of the United States and twelve times that of Egypt. This issue may be regarded as the first of a new series of annual reports.

AN important contribution to the geography of Canada has been made by Mr. J. B. Tyrrell, of the Geological Survey, in a paper reprinted from the Transactions of the Royal Canadian Institute, Toronto, entitled "Algonquian Indian Names of Places in Northern Canada." In the course of fifteen years' service in that region Mr. Tyrrell made extensive inquiries from natives regarding the original names of the chief physical features in the Cree and Ojibway languages. He gives a long list of the native names with those now current. In some cases the native name has been preserved with more or less modification; in others it has been replaced by a translation into English; in others, again, it has been replaced by a purely English designation. Thus a place which in the native tongue was called by a name meaning "A Hole through the Earth," has become "Oxford Lake." The native terms now recorded throw welcome light on the proper pronunciation of geographical terms. It is to be hoped that these names will now be systematically recorded before they finally disappear. Such lists may supply some information on Indian tribal history before the entry of Europeans into the country.

ALTHOUGH the genesis of the various thirty-two systems of crystallography has formed the subject of numerous writings at the hands of Hauy, Brocke, Bravais, Schoenfliess, and others, a suggestive note contributed to the *Atti dei Lincei,* xxiv., 7, by Dr. C. Viola throws new light on several portions of the subject. Instead of basing his classification on symmetry, he classifies the principal six systems by means of the properties of zones normal to faces, proving the following theorems:—A plane of symmetry is a face and is normal to a zone; an axis of symmetry is a zone, and is normal to a face; a zone which is normal to a face is necessary for the existence of a plane of symmetry or of a symmetrical or specular axis; two zones normal to faces and inclined to each other involve the presence of a zone orthogonal to them, and as many zones normal to faces as there can be in their common plane; two orthogonal zones normal to faces involve the existence of a third, and only a third, zone normal to a face; three zones normal to faces inclined to each other are sufficient and necessary conditions that every face should be normal to a zone. These theorems establish the existence of the following systems: triclinic, monoclinic, trimetric, dimetric, hexagonal, and monometric. It is pointed out that similar methods are applicable to investigate the properties of systems other than crystals.

MR. W. THOMSON described to the Manchester and Salford Sanitary Association on July 6 an ingenious method for obtaining a dust and smoke record. A hollow brass cylinder has a small slit cut in the side over which a ribbon of filter paper is stretched, whilst the air is passed through the paper by exhausting the interior of the cylinder. After a half-hour's exposure the ribbon is automatically moved on and a fresh surface exposed. In this way the fine dust and smoke are deposited in rectangular patches at half-hour intervals, and the depth of colour produced can be used as a means of comparison over any desired period. It appears that in Manchester, where the investigation was carried out, the atmosphere is most polluted on Mondays and Tuesdays and least on Sundays.

PART 3, vol. v., of the Journal of the College of Agriculture, Tokyo, is almost entirely devoted to mycological researches, and it forms a very important addition to the literature on the subject. With one exception the papers are printed in English, and it is to be hoped that one desirable result of the present disastrous war will be the spread of English in preference to German in the scientific literature of Japan. The papers are illustrated with plates of great accuracy and beauty, which testify to the care with which the investigations have been performed. Indeed, they would appear to rank with those carried out in the famous Carlsberg Laboratory of Copenhagen. It is interesting to note the developments caused by the intrusion of chemistry into mycology—the Saccharomyces are characterised to-day as much by their selective behaviour towards various carbohydrates and amino-compounds as by their morphological characters.

FERMENTED beverages have always been the hunting-ground of the mycologist, and the majority of the known species have been obtained from this source. The beverages of the Far East are quite peculiar in the nature of their ingredients, and experience has demonstrated that they contain a unique flora of Saccharomyces. The latest Chinese beverage to be studied is "Shaoshing-chu," of which very large quantities are manufactured in the province of Chü-Chiang. Mr. Takahashi describes (Journal of the College of Agriculture, Tokyo, vol. v., p. 200) several varieties of *Saccharomyces shaoshing,* a new species of yeast analogous to saké yeast, as well as four new forms of a *Zygosaccharomyces shaoshing.* The same number of the journal describes the budding fungi of a beverage made from a mash of steamed soy bean and roasted wheat. Five different Zygosaccharomyces were isolated. The assimilation of amino-acids from their pabulum by these yeasts is studied in detail, and the interesting fact established that it is materially smaller than in the case of saké yeast. Another Japanese beverage of which the soy bean forms the basis is "Hatsuchō-miso." This generally takes from three to five years to ripen, and is highly valued on account of its special aroma and taste. A preliminary investigation of the fungi present and the chemical changes occurring during the ripening indicates that the quantity of amino-acids present in the mash is an important factor, and there is a probability that such work will lead to the improvement of the product.

OUR ASTRONOMICAL COLUMN.

A BRIGHT METEOR, JULY 17.—A brilliant, swift meteor (=Venus) was observed by Mr. H. E. Goodson at the Hill Observatory, Salcombe Regis, on July 17, 10h. 54m. p.m. G.M.T. The path practically crossed δ Scorpionis, and was directed towards 42 Librae. The trail, about 3° long, persisted several seconds.

THE DETERMINATION OF EASTER DAY.—Anyone who desires a clear and simple account of the principles on which the determination of Easter Day depends may be recommended to consult a paper by Dr. A. M. W. Downing, which was read before the Victoria Institute on March 15 of this year. The problem involves the combination of the three incommensurable periods, the week, the lunar month, and the tropical year, and has been further complicated by changes in the calendar. The way in which the adjustment has been effected to comply with the primitive ecclesiastical rule is here explained in untechnical language and with much interesting historical detail. A discussion of the more comprehensive mathematical rules, like that of Gauss, would have been outside the scope of the paper, which deals rather with the construction and use of